

## 5-YEAR REVIEW

### Short Form Summary

**Species Reviewed:** *Bidens wiebkei* (ko‘oko‘olau)

**Current Classification:** Endangered

#### **Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2016. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 76 species in Hawaii, Oregon, Washington, Montana, and Idaho. Federal Register 81(29): 7571–7573.

#### **Lead Region/Field Office:**

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai‘i

#### **Name of Reviewers:**

Cheryl Phillipson, Biologist, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator, PIFWO

Gregory Koob, Conservation & Restoration Team Manager, PIFWO

#### **Methodology used to complete this 5-year review:**

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (Service) beginning in August 2017. The review was based on a review of current, available information since the last 5-year review for *Bidens wiebkei* (USFWS 2011). The evaluation by Cheryl Phillipson, Biologist, was reviewed by Lauren Weisenberger, Plant Recovery Coordinator, and Gregory Koob, Conservation and Restoration Team Manager.

#### **Background:**

For information regarding the species listing history and other facts, please refer to the Fish and Wildlife Service’s Environmental Conservation On-line System (ECOS) database for threatened and endangered species ([http://ecos.fws.gov/tess\\_public](http://ecos.fws.gov/tess_public)).

#### **Review Analysis:**

Please refer to the previous 5-year review for *Bidens wiebkei* published in the Federal Register on August 2, 2011 (available at [https://ecos.fws.gov/docs/five\\_year\\_review/doc3803.pdf](https://ecos.fws.gov/docs/five_year_review/doc3803.pdf)) for a complete review of the species’ status, threats, and management efforts. We are not aware of any significant new information regarding the species’ biological status since listing to warrant a change in the Federal listing status of *B. wiebkei*.

This short-lived perennial herb in the Asteraceae (sunflower) family is endangered and endemic to Moloka‘i. The current status and trends for *Bidens wiebkei* are provided in the tables below.

#### New Status Information:

- In 2011, there were seven populations that totaled fewer than 250 individuals on Moloka‘i. Currently, there are six populations totaling fewer than 200 individuals: below Pu‘ukolekole Gulch in Kamakou Preserve and extending below (50 individuals) (NTBG 2014; PEPP 2017); 10 individuals at Kumu‘eli (NTBG 2014); west of Waialua (10 individuals) (PEPP 2013, 2017); Waialua below Kahawaiiki Gulch (3 individuals) (NTBG 2006; Bakutis 2006, in litt.); Lamaloa Gulch (15 individuals) (PEPP 2013, 2017); and Kua Gulch (100 individuals) (PEPP 2017). There are no new observations of the 100s of individuals at Pāpalaua east to Puahanunui (last observed in 2010) (PEPP 2010).
- In 2016, 14 critical habitat units were designated in three ecosystems (coastal, lowland wet, montane wet) for *Bidens wiebkei* on Moloka‘i (7,515 ac, 3,041 ha).

#### New Threats:

- Climate change loss or degradation of habitat—Climate change may pose a threat to this species. Fortini *et al.* (2013) conducted a landscape-based assessment of climate change vulnerability for native plants of Hawai‘i using high resolution climate change projections. Climate change vulnerability is defined as the relative inability of a species to display the possible responses necessary for persistence under climate change. The assessment by Fortini *et al.* (2013) concluded that *Bidens wiebkei* is highly vulnerable to the impacts of climate change, with a vulnerability score of 0.735 (on a scale of 0 being not vulnerable to 1 being extremely vulnerable to climate change). Therefore, additional management actions are needed to conserve this taxon into the future.
- Landslides and erosion—Destruction or degradation of habitat—Botanists noted that landslides are a threat to individuals of *Bidens wiebkei* at Kumu‘eli, below Pu‘ukolekole, and Lamaloa (NTBG 2002, 2005; PEPP 2013). In addition, erosion of sea cliffs is a threat to *B. wiebkei* that occurs east of Pāpalaua (PEPP 2010). Landslides and erosion due to natural weathering destabilizes substrates, alters hydrological patterns, and damages and destroys individual plants (Stearns 1985).

#### New Management Actions:

- Captive propagation for genetic storage and reintroduction—
  - There are 10 founders from west of Waialua, 15 founders from Lamaloa Gulch, 50 founders from Pu‘ukolekole, and 100 founders from Kua Gulch, represented in seed collections (PEPP 2017).
  - NTBG reported 43 seeds from Kumueli, 225 seeds from Lamaloa Gulch, and 100 seeds from Pu‘ukolekole (from at least four founders) in storage between 2013 and 2014 (NTBG 2018).

#### Synthesis:

Currently, there are six occurrences totaling fewer than 200 individuals on Moloka‘i. A landscape-based assessment of climate change vulnerability for native plants of Hawai‘i using high resolution climate change projections was made by Fortini *et al.* (2013) and their analysis showed that *Bidens wiebkei* is highly vulnerable to the effects of climate

change, in that there will be a smaller area of suitable habitat available for the species in the near future. Approximately 300 seeds are in storage representing three populations.

Stabilizing (interim), downlisting, and delisting objectives were provided in the Recovery Plan for the Moloka'i Plant Cluster (USFWS 1996), and have been updated according to the draft revised recovery objective guidelines developed by the Hawai'i and Pacific Plants Recovery Coordinating Committee (HPPRCC 2011). The HPPRCC identifies an additional initial objective, the Preventing Extinction Stage, in addition to the Interim Stabilization, Delisting, and Downlisting objectives. Furthermore, life history traits such as breeding system, population size fluctuation or decline, and reproduction type (sexual or vegetative), have been included in the calculation of goals for the number of populations and reproducing individuals for each stage. The goals for each stage remain grouped by life span defined as annual, short-lived perennial (fewer than 10 years), or long-lived perennial.

*Bidens wiebkei* is a short-lived perennial herb. To prevent extinction, which is the first step in recovering the species, the taxon must be managed to control threats (*e.g.*, fenced) and have 50 individuals (or the total number of individuals if fewer than 50 exist) from each of three populations represented in an *ex situ* (secured off-site, such as a nursery or seed bank) collection. In addition, a minimum of three populations should be documented on Moloka'i. Each of these populations must be naturally reproducing (*i.e.*, viable seeds, seedlings, saplings) and increasing in number, with a minimum of 50 mature, reproducing individuals per population.

The preventing extinction goals for this species have not been met (Table 1), there are only two populations that may total 50 individuals, all threats are not being managed, and genetic storage is not complete, though close to completion (Table 2). Therefore, *Bidens wiebkei* meets the definition of Endangered as it remains in danger of extinction throughout its range.

#### **Recommendations for Future Actions:**

Landslides have been noted as an additional threat to several occurrences of *Bidens wiebkei*; however, this information does not change the species' biological status since the last 5-year review in 2011. Thus, the following recommendations for future actions are added or reiterated for the 5-year review for 2018.

- Ungulate monitoring and control—Continue to construct and maintain fenced enclosures to protect individuals from the negative impacts of feral ungulates. Protect all occurrences against browsing and habitat disturbances from feral ungulates.
- Invasive plant monitoring and control—
  - Control established ecosystem-altering nonnative invasive plant species around all populations.
  - Control invasive nonnative species that compete with the species around all populations.
- Captive propagation for genetic storage and reintroduction—Continue propagation efforts for maintenance of genetic stock.

- Reintroduction and translocation—Reintroduce individuals into suitable habitat within historic range that is being managed for known threats to this species.
- Fire monitoring and control—Develop and implement fire prevention management plans.
- Predator and herbivore monitoring and control—Implement effective control methods for rodents.
- Stochastic events—Build resilience and redundancy—Increase numbers of populations and individuals scattered through historic range to reduce impacts from landslides and erosion.
- Alliance and partnership development—Continue to work with partners in planning and implementation of ecosystem-level restoration and management to benefit this taxon.
- Climate change adaptation strategy—Assess the modeled effects of climate change on this species, and determine future landscape needed for the recovery of the species.

**Table 1. Status and trends of *Bidens wiebkei* from listing through current 5-year review.**

<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>Stability Criteria identified in Recovery Plan</b>	<b>Stability Criteria Completed?</b>
1992 (listing)	60	0	All threats managed in all three populations	No
			Complete genetic storage	No
			Three populations with 50 mature individuals in each	No
1996 (recovery plan)	> 100	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	No
2003 (critical habitat)	> 200	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals in each	Partially
2011 (5-year review)	500	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals each	Partially, Lamaloa Gulch 200 individuals; Puahaunui several 100 individuals

2016 (critical habitat)	500	0	All threats managed in all three populations	No
			Complete genetic storage	Partially
			Three populations with 50 mature individuals in each	Partially, Lamaloa Gulch 200 individuals; Puahaunui several 100 individuals
<b>Date</b>	<b>No. wild individuals</b>	<b>No. outplanted</b>	<b>*Preventing Extinction Criteria identified by HPPRCC</b>	<b>*Preventing Extinction Criteria Completed?</b>
2018 (5-year review)	200	0	All threats managed in all three populations	No
			Complete genetic storage	Close to completion
			Reproduction ( <i>i.e.</i> viable seeds, seedlings) at all three populations	No
			Three populations with 50 mature individuals in each	Partially, 50 individuals at Puu Kolekole and 100s from Papalaua to Puahaunui

\* The Preventing Extinction Stage was established in 2011. Prior to 2011, the Interim Stabilization Stage was the first stage towards recovery (now it is the second after Preventing Extinction).

**Table 2. Threats to *Bidens wiebkei* and ongoing conservation efforts.**

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulate degradation of habitat	A	Ongoing	Partial, one fenced population
Established ecosystem altering invasive plant species degradation of habitat	A	Ongoing	Partial, nonnative plant control at one fenced population
Landslides and erosion destruction or degradation of habitat	A	Ongoing	None
Climate change degradation or loss of habitat	A	Ongoing	None
Fire destruction or degradation of habitat	A	Ongoing	None
Ungulate predation or herbivory	C	Ongoing	None
Rodent predation or herbivory	C	Ongoing	None
Invertebrate predation or herbivory	C	Ongoing	None
Invasive species—Nonnative plant competition	E	Ongoing	Partial, one fenced population

**References:**

See the previous 5-year review for a full list of references (USFWS 2011). Only references for new information are provided below.

Fortini, L., J. Price, J. Jacobi, A. Vorsino, J. Burgett, K. Brinck, F. Amidon, S. Miller, S. Gon II, G. Koob, and E. Paxton. 2013. A landscape-based assessment of climate change vulnerability for all native Hawaiian plants. Technical report HCSU-044. Hawai‘i Cooperative Studies Unit, University of Hawai‘i at Hilo, Hawai‘i. 134 pp.

[HPPRCC] Hawai‘i and Pacific Plants Recovery Coordinating Committee. 2011. Revised recovery objective guidelines. 8 pp.

[NTBG] National Tropical Botanical Garden. 2002. NTBG database herbarium specimen detail for *Bidens wiebkei*. 056644, 21 NOV 2002.

[NTBG] 2005. NTBG database herbarium specimen detail for *Bidens wiebkei*. 058687, 30 NOV 2005.

[NTBG] 2006. NTBG database herbarium specimen detail for *Bidens wiebkei*. 049429, 31 JAN 2006.

[NTBG] 2014. Controlled propagation report.

[NTBG] 2018. Controlled propagation report.

Oppenheimer, H. 2009, in litt. Email regarding *Bidens wiebkei* locations and place names - 5-yr review, 14 OCT 2009.

[PEPP] Plant Extinction Prevention Program. 2010. PEPP annual report fiscal year 2010 (July 1, 2009-June 30, 2010). 121 pp.

[PEPP] 2013. PEPP annual report fiscal year 2013 (July 1, 2012-June 30, 2013). 207 pp.

[PEPP] 2017. Statewide species totals *ex situ*, Excel table.

Stearns, H.T. 1985. Chapter 4. Geology. *In* Geology of the State of Hawai‘i, second edition, Pacific Books, Palo Alto. Pp. 99–107, 291–305.

[USFWS] U.S. Fish and Wildlife Service. 2011. *Bidens wiebkei* 5-year review summary and evaluation. USFWS Pacific Islands Fish and Wildlife Office, Honolulu, HI. [https://ecos.fws.gov/docs/five\\_year\\_review/doc3803.pdf](https://ecos.fws.gov/docs/five_year_review/doc3803.pdf).

[USFWS] 2016. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 76 species in Hawaii, Oregon, Washington, Montana, and Idaho. Federal Register 81(29): 7571–7573, February 12, 2016.

[USFWS] 2016. Endangered and threatened wildlife and plants; designation and nondesignation of critical habitat on Molokai, Lanai, Maui, and Kahoolawe for 135 species, final rule. Department of the Interior, Federal Register 81 (61): 17790–18110, March 30, 2016.



**U.S. FISH AND WILDLIFE SERVICE**  
SIGNATURE PAGE for 5-YEAR REVIEW of *Bidens wiebkei* (ko‘oko‘olau)

**Pre-1996 DPS listing still considered a listable entity?**   N/A  

**Recommendation resulting from the 5-year review:**

<u>          </u>	Delisting
<u>          </u>	Reclassify from Endangered to Threatened status
<u>          </u>	Reclassify from Threatened to Endangered status
<u>    X    </u>	No Change in listing status

**For Field Supervisor, Pacific Islands Fish and Wildlife Office**